Cross-National Variation in Occupational Distributions, Relative Mobility Chances, and Intergenerational Shifts in Occupational Distributions

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CROSS-NATIONAL VARIATION IN OCCUPATIONAL DISTRIBUTIONS, RELATIVE MOBILITY CHANCES, AND INTERGENERATIONAL SHIFTS IN OCCUPATIONAL DISTRIBUTIONS*

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Krauze and Slomczynski (1986a) have proposed a non-negative decomposition of observed frequencies in a social mobility classification into "circulation" and "structural" components. In the present paper, we show that the Krauze-Slomczynski decomposition fails to satisfy minimal methodological requirements for cross-national comparisons. We explain why this decomposition cannot be used to test the Featherman-Jones-Hauser hypothesis of cross-national similarity in relative mobility chances. We also identify several questionable procedures in the empirical work of Slomczynski and Krauze (1987) and show how these procedures have affected their conclusions. In the second part of our paper, we discuss some advantages of the recently proposed Sobel-Hout-Duncan model in partitioning marginal effects in a mobility classification and use this model to embed the explanation of marginal effects in an illustrative analysis of cross-national variation in patterns of mobility. The results suggest that both economic and political development can reduce the strength of symmetric interactions between occupational origins and destinations. In addition, economic development increases asymmetric flows by upgrading and reshaping the occupational structure, whereas political development produces a net slowdown in some types of structurally induced mobility.

The Featherman-Jones-Hauser hypothesis states that variations in intergenerational mobility within industrial nations emerge from historical or cultural differences in their occupational structures, but not from differences in their relative chances of social mobility (Featherman, Jones, and Hauser 1975, p. 340). This hypothesis, labelled the FJH revision by Erikson, Goldthorpe, and Portocarero (1979), leads to the prediction that mobility chances are "basically the same" once variations in origin and destination distributions have been controlled. The FJH revision has helped to motivate and guide comparative analyses of social mobility carried out over the last decade (see McRoberts and Selbee 1981; Erikson, Goldthorpe, and Portocarero 1982, 1983; Hope 1982; Portocarero 1983; Pontinen 1983; Hauser 1984a, 1984b; Utrecht Mobility Seminar 1985; Goldthorpe 1985; Erikson and Pontinen 1985; Kerckhoff, Campbell and Winfield-Laird 1985; Wanner 1986; Erikson and Goldthorpe 1987a, 1987b; Ganzeboom, Luijkx, Dessens, P. de

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Graaf, N.D. de Graaf, Jansen, and Ultee 1987).

However, from the very beginning, researchers have found systematic differences among countries within the generic mobility regime specified by the FJH hypothesis. Indeed, in the original article proposing the hypothesis, Featherman, Jones, and Hauser (1975, p. 339) found that "the bivariate process of mobility in Australia and the U.S. in the mid-1960s was largely the same, with minor but significant idiosyncratic patterns, originating in the main from the unique mobility patterns of men from farm origins." In the 1980s, comparative analyses have continued to identify a common pattern of social fluidity, which has served both as a generic description of intergenerational mobility and as a baseline for the specification and explanation of cross-national variation in mobility (Erikson et al. 1982; Grusky and Hauser 1984; Erikson and Goldthorpe 1987c; Yamaguchi 1987).

The central methodological feature of this work has been the development of loglinear and logmultiplicative models, which make it possible to compare relative mobility chances between classifications whose marginal distributions are different. These models solved the fundamental methodological problem of comparative mobility analysis as it was posed, for example, in the pioneering work of Rogoff (1953), Glass (1954), and Carlsson (1958). Neither the original statement and test of the FJH hypothesis nor any of the subsequent research in this tradition has depended on a decomposition of the marginal or internal frequencies in a mobility classification into components of "circulation" or "structural" mobility.

Slomczynski and Krauze (1987) have rejected this paradigm of comparative mobility research. In its place, they propose a variant of their decomposition of frequencies in a mobility classification into non-negative components of immobility, circulation mobility, and structural mobility (Krauze and Slomczynski 1986a). Using a standard set of 16 3×3 national mobility classifications (see Grusky and Hauser 1983, 1984; Hazelrigg and Garnier 1976; McClendon 1980a, 1980b), Slomczynski and Krauze compare intercountry differences in "total mobility" and "circulation mobility" by computing sets of Euclidean distances for relative frequencies, inflow and outflow proportions, and row by column odds ratios. In each case, they conclude that differences among nations in circulation mobility, so conceived and measured, are greater than those in total mobility. This set of results supposedly contradicts the FJH hypothesis and previous tests of it, which are said to be "indirect" in comparison with their "direct" tests.

Slomczynski and Krauze then carry out similar decompositions and tests in a larger, revised set of mobility tables for 22 nations. They report a correlation analysis relating measures of economic development, agricultural production, and traditionalism to a pair of odds ratios constructed by collapsing categories in their circulation mobility matrices. Again, the findings are said to contradict the FJH hypothesis, and the paper concludes that it "should be rejected" (p. 610).

Slomczynski and Krauze do not test the Featherman-Jones-Hauser hypothesis. In the first part of this paper, we show that they misrepresent the content and history of the hypothesis, that their decomposition cannot meet fundamental methodological requirements of comparative mobility analysis, and that their use of similarity comparisons to test the FJH hypothesis is logically incorrect. In addition, we identify questionable procedures in their empirical work and show how their results are distorted by including the main diagonal in their "circulation" matrices.

At the same time, Slomczynski and Krauze do pose an interesting question: How can differences in occupational distributions and shifts in such distributions be incorporated in comparative mobility analysis? In the second part of this paper, we discuss some advantages of the Sobel-Hout-Duncan (1985) model in decomposing the marginal effects in a mobility classification and show how the explanation of these effects can be embedded within a model of cross-national differences in relative mobility chances.[1]

[1] Sobel, Hout, and Duncan (1985) have proposed a class of mobility models that fit parameters for marginal shifts in mobility classifications. Such models have been applied in analyses of mobility trends in the U.S. (Hout 1988a), in comparisons of mobility in the Republic of Ireland and in Northern Ireland (Hout 1988b), in a comparison of mobility in the U.S. and Canada (Wanner 1986), and in an analysis of economic mobility in nine Common Market countries (Ultee and Luijkx 1986). Our analysis, like that of Ultee and Luijkx, extends these models by using exogenous variables to

WHAT IS THE FJH HYPOTHESIS?

The most obvious problem with the Slomczynski-Krauze (1987) paper is its misleading representation of the structure and history of the FJH hypothesis. Indeed, there is no basis for the claim that their decomposition provides a "direct test" of this hypothesis (p. 600) or refers to its "original formulation" (p. 599). Those with no previous acquaintance with this area of research might easily conclude from Slomczynski and Krauze (pp. 598–600) that Featherman, Jones, and Hauser developed their hypothesis without using loglinear or multiplicative modeling. According to Slomczynski and Krauze, researchers were actually *departing* from the original intent of Featherman, Jones, and Hauser when they applied loglinear models to test an "indirect" operationalization of the hypothesis:

> Various researchers have subsequently used a new terminology that changes the meaning of the original formulation. Some departures involve searching for invariance in social fluidity instead of attempting to compare the similarity of circulation-mobility patterns with the similarity of total-mobility patterns. . . . The intractability of the problem has led some researchers to equate certain characteristics of statistical association with circulation mobility. In consequence, the FJH hypothesis became understood as a statement about fluidity in observed mobility instead of being concerned with patterns of circulation mobility. In this paper we refer to the original formulation of the FJH hypothesis . . . (Slomczynski and Krauze 1987, pp. 598–99).

Nothing could be further from the truth.[2] We strongly agree with Slomczynski and Krauze that the meaning of the hypothesis "is imputed by the theoretical and methodological context in which it appears" (1987, p. 598), but we disagree with their description of that context. Featherman, Jones, and Hauser made no attempt to construct any decomposition of mobility frequencies. They initiated the use of loglinear models in this context. These loglinear analyses revealed that "the bivariate process of mobility in Australia and the U.S. in the mid-1960s was largely the same" (p. 339), and their "provisional hypothesis" was stated as an extension of this finding. The meaning of the FJH hypothesis never shifted in consequence of the development of loglinear models, but in fact those models were the basis of the hypothesis from its inception.[3]

If this is the case, how could Slomczynski and Krauze have been misled about the meaning of "circulation" and "structural" mobility in the context of the FJH hypothesis? One interpretation of Slomczynski and Krauze is that the authors have been confused by the several usages of "structural" and "circulation" mobility in the works on which they have drawn, and they mistakenly focused their efforts on a tangential issue in that work. To be sure, Featherman, Jones, and Hauser used the term, "circulation mobility," in referring to their hypothesis:

> . . . once differences in the respective occupational opportunity structures have been taken into account, the *pattern of circulation mobility* [emphasis added] is basically the same. We therefore venture a new, provisional hypothesis to replace the falsified Lipset-Bendix hypothesis about total rates of mobility. This new hypothesis differs in that it is specified in terms of *circulation* mobility [emphasis in the original], and states the genotypical pattern of mobility (circulation mobility) in industrial societies with a market economy and a nuclear family system is basically the same (p. 338).

The referent of "the pattern of circulation mobility" here is self-evidently the odds ratios in mobility classifications (not some set of frequencies of "circulation mobility"), since the hypothesis is stated in the context of their findings of similarity in odds ratios between Australia and the U.S., as well as their review of parallel findings of temporal invariance in the U.S. and in Great Britain.

Slomczynski and Krauze apparently draw upon another usage of the term in the same work, the traditional decomposition of total mobility into "net," "minimum," or "struc-

account for the shape of marginal distributions and intergenerational shifts in them.

[2] It is awkward to base these observations on a close reading of the original text since Hauser is a coauthor of the FJH hypothesis. Hauser never intended anything of the sort that Slomczynski and Krauze propose, and he asked them on several occasions not to make this attribution. Jones and Featherman (personal communication) have also expressed their disagreement with the Slomczynski-Krauze interpretation of Featherman, Jones, and Hauser (1975).

[3] Although we focus on the original FJH paper, Slomczynski and Krauze draw on later statements by others to describe the "original formulation" of the FJH hypothesis.

tural" mobility and a residual, "circulation" mobility (Featherman et al. 1975, pp. 336–37).[4] It is unfortunate that the terms *circulation* and *structure* were each used in more than one way, and we wish that they had not been. Even so, we can find no textual justification for the Slomczynski-Krauze interpretation of the FJH hypothesis or for their operational measures of circulation and structural mobility. We note, first, that Featherman, Jones, and Hauser enclosed the term *circulation* in quotations when they referred to the residual term in the traditional decomposition, in reference to its use with that meaning by Broom and Jones (1969). It was only after their discussion of the traditional decomposition that Featherman, Jones, and Hauser raised the question, "Are the ANU [Australian] and OCG [American] matrices the same or different?" (p. 337). Second, in their description of the results with this decomposition, Featherman, Jones, and Hauser emphasized differences between the Australian and American mobility regimes (pp. 336–37). If the traditional decomposition had been the basis of their provisional conclusions, why was the FJH hypothesis about cross-national similarities in patterns of social mobility? Third, even if one thought the FJH hypothesis referred to this decomposition, it does not follow that Featherman, Jones, and Hauser ever intended a partition of the full classification of mobility frequencies into components of "circulation" and "structural" mobility. In fact, under the traditional distinction between gross and net mobility, no decomposition of the full set of mobility frequencies is either entailed or implied. Fourth, in a paper predating the FJH hypothesis, Hauser, Dickinson, Travis, and Koffel (1975) showed that the measures of "net mobility" and "total minus net mobility" should not be used in comparative analysis because they are affected by multiplicative transformations of marginal distributions. In that context, why would these traditional measures have been proposed as tools of comparative analysis?

Slomczynski and Krauze (p. 600) carry their terminological confusion a step further and make a serious error by presuming that the parameters estimated under various loglinear models can be used to reconstruct "circulation" frequencies. They cannot, nor do we think anyone ever supposed otherwise. Models of two-way interaction have been used in mobility classifications to represent hypotheses of constant "circulation," but this usage neither entails nor requires any decomposition of mobility or immobility frequencies into components due to "circulation" or "structural" change in the sense in which Krauze and Slomczynski (1986a) use those terms. The expected frequencies under such models are not estimates of "circulation mobility"; they are estimates of mobility and immobility under a specific hypothesis, namely that relative mobility chances have remained constant when marginal (origin and destination) distributions have changed.

In summary, the definitions of "circulation" and "structural" mobility proposed by Slomczynski and Krauze are so different from and incompatible with those adopted (and fully justified) in the initial statement of the FJH hypothesis and in a large body of subsequent research that Slomczynski and Krauze are not free to draw upon that work to justify their own. Given the original text and the subsequent history of the FJH hypothesis, we cannot understand why they claim to have returned to the "original formulation" of Featherman, Jones, and Hauser.

Autonomy and Invariance

We need not discuss the face validity of the decomposition of mobility frequencies proposed by Krauze and Slomczynski, since Sobel, Hout, and Duncan (1986) have convincingly made the case that such decompositions are vastly inferior to modern methods of structural modeling. However, we have sought to determine whether the Krauze-Slomczynski decomposition meets two simple requirements of valid cross-national comparisons: autonomy and invariance.

If the parameters of a model are *autonomous,* we can make hypothetical predictions by changing a subset of the parameters and recalculating expected frequencies. In an identified loglinear model, for example, we can change one or more marginal or interaction effects, compute the corresponding set of expected frequencies, and recover the revised parameters by refitting the model. This property makes it possible for researchers to answer counterfactual questions of the form,

[4] Net mobility is given by the index of dissimilarity between origin and destination distributions.

"What would mobility in Country A look like if it had the same relative mobility chances as Country B?"

It is also important that the parameters of fluidity, association, or circulation be independent of the parameters of the occupational structure. For example, under the loglinear model, odds ratios are *invariant* with respect to scalar multiplication of entire rows or columns. Consequently, many marginal (origin or destination) distributions are consistent with a given set of row-by-column odds ratios, and many sets of odds ratios are consistent with a given set of marginals. The absence of this invariance property was one of the critical flaws of the social distance mobility ratio (Rogoff 1953; Hauser 1978), yet Krauze and Slomczynski (1986b, p. 292) dismissed the observation by Sobel, Hout, and Duncan (1986) that their decomposition was not marginally invariant.

If the components of the Krauze-Slomczynski decomposition were autonomous, it would be possible to vary "circulation mobility" and "structural mobility" freely without changing the other and recover the revised components from their sum. It is easy to show that the Krauze-Slomczynski decomposition does not have this property. Consider panel A of Table 1, where we have presented the original Polish data from Krauze and Slomczynski (1986a, p. 258) and reproduced their analysis. The first column of numbers gives relative counts of "circulation mobility"; the second column gives relative counts of "structural mobility"; and the third column reports the observed relative counts in the source table. As shown in panel A, the decomposition yields no downward structural moves between white- and blue-collar strata in Poland; it yields 68 upward structural moves between those two categories. In panel B, we reversed the "structural" mobility frequencies in cells C_{13} and C_{31} by placing 68 fewer movers in C_{31} and 68 more movers in C_{13}. The revised data are shown in column 3. Under this simple manipulation, the estimates of "structural" mobility used to construct the revised classification are not recovered, "circulation" mobility changes in three of the six cells, and the total estimate of "circulation" mobility changes markedly. It follows that the Krauze-Slomczynski decomposition is not autonomous.[5]

Table 1. Tests of Autonomy and Invariance of the Krauze-Slomczynski Mobility Decomposition

Cell	Circulation	Structural	Observed
A. Krauze-Slomczynski Mobility Classification (Poland, 1972)			
C_{12}	27	0	27
C_{13}	2	0	2
C_{21}	29	69	98
C_{23}	32	0	32
C_{31}	0	68	68
C_{32}	34	142	176
Total	124	279	403
B. Switch 68 Structural Movers from C_{31} to C_{13}			
C_{12}	27	0	27
C_{13}	70	0	70
C_{21}	97	1	98
C_{23}	32	0	32
C_{31}	0	0	0
C_{32}	102	74	176
Total	328	75	403
C. Shift 30 Observations from Row 2 to Row 1			
C_{12}	38	0	38
C_{13}	3	0	3
C_{21}	41	43	84
C_{23}	30	0	30
C_{31}	0	63	63
C_{32}	33	146	179
Total	145	252	397

If the components of the Krauze-Slomczynski decomposition were marginally invariant, it would be possible to alter origin or destination distributions without changing the patterns of "circulation" mobility. We can show that their decomposition does not have this property by changing the relative frequencies in rows 1 and 2 of the Polish data. In panel C, we added 30 observations to the first marginal row sum of the table and subtracted 30 observations from the second marginal row sum of the table. Then, we adjusted row and column entries by iterative proportional scaling, preserving the original odds ratios and all other marginal sums. This is precisely the type of manipulation under which the interaction effects of loglinear and logmultiplicative models are invariant. However, in this case, the estimates of circulation mobility changed in all but one of the

[5] Likewise, if one were to combine the "circulation mobility" of one nation with the "structural mobility" of another nation, there is no reason to expect that these components would be recovered by the Krauze-Slomczynski decomposition of the synthetic table. Such counterfactual analyses present no difficulties under loglinear or logmultiplicative models.

off-diagonal cells whose row sums had been altered. It follows that the Krauze-Slomczynski decomposition is not invariant, and we conclude that it cannot be useful in comparative analysis.[6]

TESTING THE FJH HYPOTHESIS

The FJH hypothesis cannot be tested with the similarity measures applied by Slomczynski and Krauze (1987). In their original statement, Featherman, Jones, and Hauser (1975, p. 340) introduced the following hypothesis:

> . . . the genotypical pattern of mobility (circulation mobility) in industrial societies with a market economy and a nuclear family system is basically the same. The phenotypical pattern of mobility (observed mobility) differs according to the rate of change in the occupational structure, exogenously determined . . . by . . . technological change, the supply and demand for specific kinds of labor . . ., and changing social values . . . ."

Nothing in this statement requires cross-national differences in "observed mobility" to be larger than cross-national differences in "circulation mobility." It simply says that observed mobility is affected by forces other than those determining the genotypical pattern of mobility. The net effect of these multiple forces is by no means clear, and in principle they could even offset one another and produce a "basic similarity" in observed mobility.

Previous tests of the FJH hypothesis have simply followed Featherman, Jones, and Hauser by comparing odds ratios (or functions of odds ratios). Grusky and Hauser (1984, p. 22) tested a variant of the Lipset-Zetterberg hypothesis by constraining observed relative frequencies to be cross-nationally constant, without conditioning on marginal frequencies. No one has previously suggested that the FJH hypothesis demands a comparison between cross-national differences in "circulation mobility" and "structural mobility," however measured. Slomczynski and Krauze (1987, p. 600) arbitrarily introduce an entirely new scheme for testing the FJH hypothesis: "In its original formulation, the FJH hypothesis calls for a comparison of the intercountry similarity of observed-mobility patterns with the intercountry similarity of circulation-mobility patterns." We find no rationale for this test in the original formulation or in any subsequent tests of the FJH hypothesis, nor do Slomczynski and Krauze explain their innovation, beyond the claim just quoted.

The available empirical evidence does suggest that cross-national variations in observed mobility are larger than cross-national variations in odds ratios (e.g., Grusky and Hauser 1984). It is perhaps natural, therefore, to conflate the FJH hypothesis with the latter finding. Nonetheless, this conflation is logically incorrect, and the tests of the FJH hypothesis by Slomczynski and Krauze are thus logically unsound.[7] Despite this initial error in logic, we shall review the tests conducted by Slomczynski and Krauze in detail. We find serious problems in their treatment of immobility, in their comparisons of inflow and outflow rates, and in their comparisons of odds ratios.

Reclassifying Immobiles

Slomczynski and Krauze (1987) provide no conceptual or theoretical justification for classifying frequencies on the main diagonal (immobility) as a component of circulation mobility, yet this decision has decisive effects on their empirical results. In the following reanalyses, we show that their treatment of the main diagonal is not only conceptually flawed but also makes it considerably easier for them to reject the FJH hypothesis.

The original Krauze-Slomczynski (1986a, p. 255) decomposition does distinguish between immobility and mobility. The complete mobility classification (N) is decomposed into entries on the diagonal (I) and off the diagonal (M), and the circulation mobility matrix (C) is defined as the residue of counts remaining after the matrix of structural mobility (S) is subtracted from the matrix of off-diagonal elements (M). Krauze and Slomczynski conclude (1986a, p. 255):

> The equality $C = M - S$ formally defines circulation mobility. Interpretively, circulation mobility is the part of total mobility that consists of the maximal number of persons involved in

[6] One counterexample is sufficient as mathematical disproof of the properties of autonomy and of invariance.

[7] We thank Michael Sobel for bringing this to our attention.

> status *transitions* [emphasis added] between identical origin and destination distributions.

They further claim to apply this same definition of circulation mobility in their 1987 paper (p. 601):

> Following Krauze and Slomczynski (1986) we define circulation mobility as (1) the part of total mobility (2) consisting of interchange status transitions (3) which result in identical origin and destination distributions; it is (4) limited to interchange status transitions and exhausts them.

However, despite these prior statements, we are informed midway through their 1987 paper that respondents on the main diagonal will be reclassified as "circularly mobile" (p. 602). Why have they reversed their position? Why would anyone wish to treat immobiles as "circularly mobile?" And, most importantly, how does this decision affect their results?

It is easy to show that the Slomczynski-Krauze tests based on relative frequencies are seriously distorted by reclassifying respondents in this manner. Indeed, when two mobility tables have equal proportions in their corresponding off-diagonal cells, the Euclidean distance between the diagonal proportions in the circulation matrices will necessarily be larger than the Euclidean distance between the same entries in the original matrices. The discrepancies on the diagonal loom larger when the "structurally" mobile respondents have been removed, since the diagonal entries will make up a larger share of the total when off-diagonal counts are reduced. Consequently, the Euclidean distance is exaggerated, and the "FJH hypothesis" can be rejected more readily. In a private communication with us, Michael Hout has stated this simple conclusion more elegantly: "The identity $C = N - S$ guarantees that the denominator based on C will be less than the denominator based on N."

The practical implications of this distortion are spelled out in lines 1 to 3 of Table 2. As shown in the first line of this table, we have repeated the Slomczynski-Krauze analyses of relative frequencies "proportions"), using the standard 16-nation intergenerational classifications. The left-hand entry on this line reports the number of cases where the cross-table differences in circulation mobility are larger than the corresponding distances in observed mobility ("pairwise rejections"), and the two right-hand columns report the squared Euclidean distances averaged over the 120 pairwise comparisons among each set of tables.[8] In lines 2 and 3, the entries on or off the main diagonal have been excluded, and the same set of pairwise comparisons have been carried out within the diagonal and

Table 2. Pairwise Rejections and Squared Euclidean Distances for Proportions, Inflow Rates, and Outflow Rates in 16-Nation Sample

		Squared Euclidean Distances Averaged Across 120 Tests	
Measure	Pairwise Rejections	Observed	Circulation
1. Proportions	101	.0895	.1207
2. Off-diagonal proportions	15	.0134	.0046
3. Main diagonal proportions	115	.0761	.1160
4. SK simultaneous inflow-outflow test	65	—	—
5. Inflow rates	30	.1542	.0821
6. Outflow rates	43	.1340	.0868
7. Combined inflow and outflow rates	20	.2881	.1689

Note: The entry in column 1 is the number of times the FJH hypothesis (as interpreted by Slomczynski and Krauze) was rejected in 120 pairwise tests. The entries in columns 2 and 3 are the means of the squared Euclidean distances for the same 120 pairwise tests. See text for further details.

[8] The intercountry distances between proportions are reported in Table 4 of Slomczynski and Krauze (1987, p. 606). They claim that the "FJH hypothesis" can be rejected in 105 out of 120 cross-national comparisons of distances between proportions (p. 605), but we find 101 rejections. We believe this discrepancy occurred because Slomczynski and Krauze rounded their findings to two significant digits, and we did not. Our efforts to reproduce this and other analyses were also hampered by their confusion about the source of the Japanese data used in their analyses. Although Slomczynski and Krauze state (p. 602) that their 16-nation data are those used by Grusky and Hauser (1983), their Table 2 (p. 603) reports a different set of Japanese data. The summary measures of mobility in Table 3 (p. 605) do agree with the data in Table 2, but we were only able to reproduce the findings in Table 4 (p. 606) and Table 5 (p. 607) with the version of the Japanese data reported by Grusky and Hauser. Slomczynski (private communication) has told us that his analyses were based on the revised Japanese data of his Table 2, but his own FORTRAN code (kindly supplied by him at our request) confirms that they were based on the Grusky-Hauser version of the Japanese data.

off-diagonal components of the classifications. It is possible, in this way, to decompose the distances for the full classification into a component produced by the entries on the main diagonal and a complementary component produced by the entries off the diagonal (i.e., .0895 = .0134 + .0761, and .1207 = .0046 + .1160).

The results in this table are striking. In both sets of occupational classifications, the entries on the main diagonal dominate those off the diagonal; compare lines 2 and 3. Moreover, in the off-diagonal comparisons, the "FJH hypothesis" is rejected only 15 times, and the average pairwise distance for the circulation data is 66 percent smaller than the average distance for the observed data; that is, in line 2, compare .0134 to .0046. If we renorm the proportions to add to 100 percent within the off-diagonal components of the mobility classifications, then the Slomczynski-Krauze version of the FJH hypothesis is still rejected in only 57 of 120 comparisons. It is clear that any conclusions about cross-national variations in "circulation mobility" will be affected decisively by the treatment of the main diagonal. In the Slomczynski-Krauze analyses of proportions, the pairwise distances between the circulation matrices are inflated by including the frequencies on the main diagonal, and consequently the "FJH hypothesis" can be rejected more readily.

It is notable that Slomczynski and Krauze reinvoke their distinction between mobility and circulation mobility at one point in the text. In the right-hand columns of Table 3, they report "circularly mobiles as proportion of total sample" and "nonsymmetric flows as proportion of the amount of circulation mobility." In these cases, the proportions "circularly mobile" do not include frequencies on the main diagonal, and they conclude that nonsymmetric flows are "large enough to warrant that nonsymmetric exchanges are an empirically important part of circulation mobility" (p. 605). The nonsymmetric flows would be minuscule proportions of "circulation mobility" under the more inclusive definition used elsewhere by Slomczynski and Krauze.

Outflow and Inflow Rates

The classification of immobile individuals as "circularly mobile" also affects the Slomczynski-Krauze tests comparing matrices of outflow and inflow rates, but other problems of validity became evident when we attempted to replicate these tests. In their Table 1 (p. 601) and in equation 3 on p. 602, Slomczynski and Krauze set up a block-diagonal matrix of inflow and outflow rates and imply that their test is based on a calculation of Euclidean distances across all of the cells of this single matrix. However, on page 605, when Slomczynski and Krauze introduce the results from their calculations, they describe a completely different test. They state that the FJH hypothesis will be rejected unless "formula (2) is satisfied for both outflow rates and inflow rates" (p. 605). The latter text suggests that they actually carried out *separate* comparisons based on outflow rates and on inflow rates, and that they rejected the hypothesis whenever *either* test failed to satisfy the inequality expressed in equation 2. When we carry out the tests in this fashion, we reproduce the findings of Slomczynski and Krauze exactly (line 4, Table 2).[9]

This procedure strongly affects the interpretation of their results. If inflow and outflow tests were independent and random, we would still expect the joint testing procedure of Slomczynski and Krauze to reject the FJH hypothesis 75 percent of the time. In the present case, the FJH hypothesis is rejected in only 30 inflow tests (line 5) and in 43 outflow tests (line 6), yet the rejection rate can be increased to 65 by requiring that both tests simultaneously satisfy equation 2 (line 4). The 65 rejections with these data are fewer than the 90 rejections ($.75 \times 129 = 90$) one would expect to find if the test outcomes were independent and random. We also found only 20 rejections in tests based on the original, block-diagonal matrix of inflow and outflow

[9] We can also reproduce the findings of Slomczynski and Krauze (p. 607) in the case of separate comparisons of outflow rates and of inflow rates within the 22-nation sample. That is, the "FJH hypothesis" was rejected in 29 percent of the comparisons using outflow rates and in 25 percent of the comparisons using inflow rates. Since these reported rates of rejection fall below those stated by Slomczynski and Krauze as a criterion for global rejection of the FJH hypothesis, we are puzzled by their failure to comment on this discrepant finding beyond their apparently inconsistent conclusion: "Generally, the results of the test for 22 countries are similar to those for 16 countries" (p. 607).

rates (Line 7).[10] It follows that these measures provide no support for their conclusions.

Odds Ratios

In their final set of pairwise tests, Slomczynski and Krauze (1987, p. 601) use a complete set of odds ratios and "crossing odds" to carry out the comparisons. They find that the Euclidean distances among the "circulation" matrices are often larger than the corresponding distances among the observed data and conclude that the FJH hypothesis should be rejected. Once again, the findings are weakened, not only by their treatment of the main diagonal, but also by their use of a joint testing procedure. We also disagree with the way Slomczynski and Krauze interpret the odds ratios calculated from the observed 16-nation data. Although we and many other researchers regard the cross-national similarity in these odds ratios as direct evidence in favor of the FJH hypothesis, Slomczynski and Krauze interpret the same results as evidence against the hypothesis. Their interpretation is incorrect and invalidates their conclusions.

Modeling Origin-Destination Differences

Even though the Krauze-Slomczynski decomposition cannot be used to test the FJH hypothesis, their analyses do raise interesting questions about the structure of cross-national differences in occupational distributions and about the effects of exogenous variables on the shape of these distributions. Indeed, by modeling occupational distributions and origin-destination shifts, we can begin to understand why the classic Lipset-Zetterberg hypothesis of equal mobility rates can be wrong even when the FJH hypothesis is right.

It should be kept in mind that origin-destination differences in class or occupation distributions do not correspond directly to simple temporal changes in the structure of the labor force (Mukherjee 1954; Duncan 1966). These differences arise from interoccupational variations in the timing and quantity of fertility, as well as variations in the rate of entrances into and exits from the labor market, and secular changes in occupation or class distributions. In fact, since so many factors affect differences between origin and destination distributions, it is by no means clear how to interpret them or to construct credible models predicting them. Obversely, given the demographic basis of the intergenerational mobility table, there is no reason to believe that equality of origin and destination distributions (or symmetry in the frequencies) in a mobility table corresponds to any sociologically interpretable state of equilibrium. Consequently, to the degree that changes in occupational structure have been brought into comparative mobility analysis (e.g., Hauser et al. 1975; Featherman and Hauser 1978), the models have focused on differences between the marginals of independent mobility classifications, not on differences between origins and destinations within these classifications.

It is possible, nonetheless, to bring origin-destination differences explicitly into descriptive analyses of mobility with the Sobel-Hout-Duncan (SHD) mobility model (1985, 1986). The SHD model includes parameters for association between origins and destinations, for the shape of origin distributions, and for shifts in destination distributions that apply equally to each origin category.[11] Because the SHD parameters can be specified in a loglinear (logmultiplicative) model, their proposal makes it possible to compare mobility classifications without the methodological defects of the Krauze-Slomczynski decomposition. We will show that, beyond the problems already noted, the Krauze-Slomczynski decomposition is incommensurable with the SHD model.

For the 3×3 table, the SHD model can be written in the following way:

$$E(X_{ij}) = \alpha_j \beta_i \beta_j \delta_{ij} \gamma_{ij} \qquad [1]$$

where X_{ij} is the observed frequency in the ij^{th} cell of a 3×3 classification, $\alpha_3 = 1$, $\beta_i = \beta_j$ if $i = j$, $\delta_{ij} = \delta_{ji}$, $\delta_{ij} = \gamma_{ij} = 1$ if $i = j$, $\gamma_{ij} = \gamma$ when $[i,j] = [1,2]$, $[2,3]$ or $[3,1]$, and $\gamma_{ij} = 1/\gamma$ when $[i,j] = [2,1]$, $[3,2]$, or $[1,3]$.

[10] This result conflicts with the report of 31 rejections ($120-89=31$) by Slomczynski and Krauze (p. 606), and we have been unable to locate the source of this discrepancy. We have confirmed our own finding independently using GLIM and Lotus 1-2-3.

[11] Hope (1981, 1982) has proposed a related class of models. However, the models differ in that Hope writes the marginals as the sum and difference of origin and destination effects, and he incorrectly proposes that marginal homogeneity be tested against simple independence (rather than quasi-symmetry.

This model says that expected frequencies are generated by three symmetric marginal effects (β_1, β_2, and β_3), two asymmetric marginal parameters (α_1 and α_2), three symmetric interaction terms (δ_{12}, δ_{13}, and δ_{23}), and a single asymmetric interaction effect (γ). The SHD parameterization therefore differs from conventional loglinear models by partitioning the standard set of marginal effects into symmetric and asymmetric components. If quasi-symmetry holds, then the patterns of "exchange mobility" are governed by the five symmetric terms, and the patterns of "structural mobility" are governed by the remaining asymmetric terms. Consequently, under this model, there are marginal effects both for "exchange" and "structural" change (see Sobel, Hout, and Duncan 1985 for additional details).

The problems with the Krauze-Slomczynski decomposition become apparent when the SHD model is applied to the three occupational classifications in Table 3. In the first panel of this table, we have reproduced the standardized counts for the 1972 Polish classification. The full set of multiplicative estimates for this classification are presented in the first column of Table 4, but for our purposes the coefficient for the asymmetric interaction effect is of most interest (i.e., in column 1, γ = 1.09). It follows from this coefficient that the counts in the [1,2], [2,3], and [3,1] cells are approximately 9 percent larger than they would be under the model of quasi-symmetry. In the Krauze-Slomczynski decomposition of the same occupational classification, the frequencies of "circulation mobility" are also asymmetric, but the asymmetries appear in the opposite direction; that is, in panel B, $C_{12} < C_{21}$, $C_{23} < C_{32}$, and $C_{31} < C_{13}$. The counts in this matrix are distorted because the Krauze-Slomczynski decomposition cannot separate asymmetric marginal effects (α_1 and α_2) from an asymmetric interaction effect (γ). We believe that most researchers would want to distinguish between these two sources of asymmetry in their analyses of mobility classifications. Indeed, in the SHD model, the former type of asymmetry pertains to structural mobility, and the latter type corresponds to "unreciprocated" mobility.

The same problem can arise when the observed data are made "quasi-symmetric" by forcing the interaction effects to be symmetric about the main diagonal. In the second panel of Table 3, we have removed the "semipermeable effect" from the Polish classification by multiplying or dividing the off-diagonal counts by γ. For example, in panel 2, X_{13} = 2.00 × 1.09 = 2.18. Thus, in this revised quasi-symmetric classification,

Table 3. Frequencies for Observed and Hypothetical Occupational Cross-Classifications

Cross-Classification	(a)	(b)	(c)
1. Table A (1972 Polish cross-classification)			
(a) Nonmanual	67.000	27.000	2.000
(b) Manual	98.000	220.000	32.000
(c) Farm	68.000	176.000	310.000
2. Table B (Semipermeable effect removed)			
(a) Nonmanual	67.000	24.707	2.186
(b) Manual	107.094	220.000	29.283
(c) Farm	62.225	192.333	310.000
3. Table C (Strengthened symmetric marginal effect for manual stratum)			
(a) Nonmanual	67.000	54.000	2.000
(b) Manual	196.000	880.000	64.000
(c) Farm	68.000	352.000	310.000

Note: In each panel, the rows refer to occupational origins, and the columns refer to occupational destinations. The Polish table in panel 1 was taken from Krauze and Slomczynski (1986a, p. 258).

Table 4. SHD Multiplicative Model and Krauze-Slomczynski Linear Programming Estimates for Tables A, B, and C

Model	Table A	Table B	Table C
A. SHD multiplicative model			
α_1	28.47	28.47	28.47
α_2	6.57	6.57	6.57
β_1	1.53	1.53	1.53
β_2	5.79	5.79	11.57
β_3	17.61	17.61	17.61
δ_{12}	0.42	0.42	0.42
δ_{13}	0.08	0.08	0.08
δ_{23}	0.29	0.29	0.29
γ	1.09	1.00	1.09
B. Krauze-Slomczynski circulation matrix			
C_{12}	27.00	24.71	54.00
C_{13}	2.00	2.19	2.00
C_{21}	29.00	26.89	56.00
C_{23}	32.00	29.28	64.00
C_{31}	0.00	0.00	0.00
C_{32}	34.00	31.47	66.00
Circulation-mobility rate	0.124	0.113	0.121

Note: The circulation-mobility rate in Panel B is the sum of the six C_{ij} estimates divided by the total sample size. The estimates in Panel A are in multiplicative form. See text for more details.

$\gamma = 1$ by construction (see Table 4).[12] However, even though we have forced the interaction effects in this matrix to be symmetric, the "circulation mobility" frequencies under the Krauze-Slomczynski decomposition are still asymmetric. Once again, the presence of asymmetric marginal effects has led to distorted results (relative to the SHD model) by producing corresponding asymmetries in the set of circulation counts. We believe that most researchers would prefer models or methods that generate symmetric circulation counts from quasi-symmetric frequencies.

In the third panel of Table 3, we have multiplied the second row and the second column in Table A by a factor of 2. Under this rescaling, only the symmetric parameter β_2 changes in the SHD model; that is, to use the terminology of Sobel, Hout, and Duncan (1985), the amount of "exchange mobility" has increased by virtue of a strengthened symmetric effect within the manual sector. However, in panel B, the corresponding Krauze-Slomczynski estimates cannot be interpreted so easily (column 3, Table 4). In this case, increases in circulation mobility have been registered in several of the off-diagonal cells in the second row and column, yet we could not have determined the sources of the increases without our knowledge of the initial manipulations. These changes in the "circulation" frequencies might have been generated by changes in the sizes of social classes, or by complex fluctuations in the flows between these classes. The classic distinction between marginal and interaction effects has been elegantly operationalized within the loglinear framework. Nonetheless, once the Krauze-Slomczynski decomposition is adopted, the distinction has to be dropped.

EXPLAINING MOBILITY

In the widely accepted approach to comparative analysis of occupational mobility classifications, researchers attempt to build structural models of odds and odds ratios. Although Krauze and Slomczynski (see 1986a, 1986b) reject such models as representations of mobility classifications, they subsequently turn to unfortunately crude versions of them in attempting to explain variations in "circulation mobility" among nations (Slomczynski and Krauze 1987). There would appear to be a serious logical contradiction in this. If odds ratios are not appropriate to parse the structure of an observed mobility classification, why are they appropriate in the case of a "circulation mobility" classification? Slomczynski and Krauze offer no rationale for their use of rudimentary loglinear models at this stage of their analysis.

In motivating and interpreting their comparative analyses, Slomczynski and Krauze misrepresent Grusky and Hauser (1984) by suggesting that they "claim to have demonstrated invariance" (p. 610) and by dismissing their explanatory models of mobility and immobility parameters. The fact is that Grusky and Hauser (1984, pp. 30–35) found and explained systematic differences in mobility among nations:

> While we have emphasized the fundamental similarity of mobility patterns, we do not deny that there are real national variations in social fluidity; the model of invariance can be rejected at any conventional level of statistical significance (Grusky and Hauser 1984, p. 30).

In the next five pages of tables and text, Grusky and Hauser describe and explain the sources of these cross-national variations. They summarize the results in their conclusion:

> . . . we departed from earlier international comparisons by directly incorporating several explanatory variables within a mobility model and by estimating and comparing the effects of these variables on the parameters of social fluidity. Contrary to assumptions of convergence theories, the results suggest that differences in the structure of mobility are at least as much a consequence of political organization as of economic development. The findings also suggest that the effects of political and economic variables are more complex than commonly supposed, in the sense that they cannot be generalized across the several parameters of mobility (Grusky and Hauser 1984, p. 36).

This text leaves no room for misunderstanding. Slomczynski and Krauze are grossly inaccurate in using Grusky and Hauser (1984) as a straw man on the issue of invariance.

Even if the circulation mobility decomposition were valid, there would remain other serious defects in the cross-national comparisons offered by Slomczynski and Krauze. They not

[12] The new data are the predicted values under the assumption that the asymmetric effect is zero. This procedure for "purging effects" has been elegantly applied by Clogg (1978) in a different context.

only fail to construct an explicit multivariate model of the effects of their several independent variables, but they also base their comparisons on a set of poorly specified dependent variables. In their analyses with the 22-nation sample, Slomczynski and Krauze (1987, pp. 606–9) combine the frequencies of "circulation" mobility and immobility and then construct two dependent variables from each classification. The first dependent variable is the single odds ratio in the 2×2 table formed by collapsing the manual and farm categories, and the second dependent variable is the single odds ratio in the 2×2 table formed by collapsing the manual and nonmanual categories. It is clear that the authors could not have constructed these contrasts without including immobility as a component of "circulation" mobility. Otherwise, each of their collapsed tables would contain at least one zero cell on the diagonal, and all of their odds ratios would be zero or undefined.

Moreover, Slomczynski and Krauze have chosen substantively important contrasts, but they are not independent. It has long been understood that each contrast is partly confounded with the other (Goodman 1969, p. 15). The confounding distorts effects of exogenous variables on each of the mobility contrasts as well as estimates of the contrasts themselves in each mobility table. The correct procedure, if one is interested in these particular contrasts, is to fit the two of them simultaneously, along with the effects of each of the exogenous variables. In so doing, one can test the adequacy of these contrasts as a description of the mobility classification, as well as obtain estimates of the effects of the exogenous variables. This is the procedure introduced by Grusky and Hauser (1984, pp. 30–35), but with the addition of a third contrast for blue-collar immobility.[13]

A MODEL OF CROSS-NATIONAL VARIATION IN MOBILITY

We find no reason to carry out further analyses of the Slomczynski-Krauze "circulation mobility" matrices.[14] We think it more useful to offer a multiplicative model that addresses the substantive problems posed by Slomczynski and Krauze. In our model, we permit a set of exogenous variables to affect the SHD parameters for origin categories, origin-destination shifts, and quasi-symmetric interactions (also, see Ultee and Luijkx 1986). This parameterization is related to a model recently introduced by Hout (1988a), but we depart from his formulation by using table-specific variates rather than cell-specific terms. In principle, we can estimate the model by the method of maximum likelihood; however, because the sample sizes for some of the original mobility tables were not made available to us, we cannot report the correct standard errors.

We begin with a simple, descriptive model that says cross-national variations in the mobility process are a function of economic development (I), social-democratic politics (D), and two binary variables indexing East European (R) and Asian (J) nations. In the appendix, the sources of these variables are identified, and their values are supplied for each country.[15] The expected counts in our models are estimated under the following types of constraints:

$$\log \alpha_{jk} = a_{1j} + b_{1j}I_k + c_{1j}D_k + d_{1j}R_k + e_{1j}J_k \qquad [2]$$

$$\log \beta_{ik} = a_{2i} + b_{2i}I_k + c_{2i}D_k + d_{2i}R_k + e_{2i}J_k \qquad [3]$$

$$\log \delta_{ijk} = a_{3ij} + b_{3ij}I_k + c_{3ij}D_k + d_{3ij}R_k + e_{3ij}J_k \qquad [4]$$

where i, j, and k index origin, destination,

[13] The combination of contrasts for nonmanual immobility and farm immobility yields the model of "perfect blue-collar mobility," which was estimated, tested, and rejected by Grusky and Hauser (1984, pp. 23–25). Because we have been unable to obtain the original counts for the complete 22-nation sample, we have been unable to test this model with their data.

[14] We had hoped to confirm, test, and extend the Slomczynski-Krauze comparative mobility analysis. Although they gave us a copy of their 22 standardized mobility tables (each normed to a total of 1,000 cases), they refused to release a complete listing of the original sample sizes. They did provide us with the sample sizes for three of their new tables (Czechoslovakia, Poland, and Japan), but they insisted that we consult the original sources to recover the remaining sample sizes. Since their work is based partly on similar materials obtained from us, we are surprised by this lack of reciprocity.

[15] We have chosen to use these variables in an illustrative analysis because Slomczynski and Krauze refused our request for a list of the variables they used.

Table 5. Sources of Cross-National Variability in Symmetric and Asymmetric Mobility

Model	L^2	d.f.	L^2/d.f.	L_h^2/L_t^2	L_h^2/L_t^2
A. Baseline models					
1. {A} {B} {S} {C}	5674	169	33.6	100.0	—
2. {AC} {BC} {SC}	47	22	2.1	0.8	—
3. {AC} {BC} {S}	324	85	3.8	5.7	—
B. Asymmetric mobility					
4. {A} {BC} {SC}	392	64	6.1	6.9	—
5. {AI} {AD} {AR} {AJ} {BC} {SC}	266	56	4.8	4.7	—
6. 5 vs. 4 (Explained variation)	126	8	15.8	2.2	36.5
7. 5 vs. 2 (Unexplained variation)	219	34	6.4	3.9	63.5
8. 4 vs. 2 (Total variation)	345	42	8.2	6.1	100.0
C. Symmetric mobility					
9. {AC} {B} {S}	1866	127	14.7	32.9	—
10. {AC} {BI} {BD} {BR} {BJ} {SI} {SD} {SR} {SJ}	663	107	6.2	11.7	—
11. 10 vs. 9 (Explained variation)	1203	20	60.2	21.2	66.1
12. 10 vs. 2 (Unexplained variation)	616	85	7.2	10.9	33.9
13. 9 vs. 2 (Total variation)	1819	105	17.3	32.1	100.0
D. Total mobility					
14. {C} {AI} {AD} {AR} {AJ} {BI} {BD} {BR} {BJ} {SI} {SD} {SR} {SJ}	1478	141	10.5	26.0	—
15. 14 vs. 1 (Explained variation)	4196	28	149.9	74.0	74.6
16. 14 vs. 2 (Unexplained variation)	1431	94	15.2	25.2	25.4
17. 1 vs. 2 (Total variation)	5627	147	38.3	99.2	100.0

Note: A = Asymmetric Marginal Effects, B = Symmetric Marginal Effects, S = Symmetric Association, C = Country, I = Economic Development, D = Social Democracy, R = Eastern Block, J = Asia. The denominator in the first L_h^2/L_t^2 ratio is the association under the model of independence (line A1), and the denominator in the second ratio is the variation in asymmetic (line B8), symmetric (line C13), or total (line D17) mobility.

and country. In this context, α_{jk}, β_{ik}, and δ_{ijk} refer to the SHD parameters defined in equation 1, and I_k, D_k, R_k, and J_k refer to the exogenous variables defined in the appendix. The subscripted coefficients a through e can be interpreted as the intercepts and slopes in the regression of the SHD parameters on the four exogenous variables. In our analysis, these constraints are embedded within the SHD model, and we obtain simultaneous maximum likelihood estimates of all of the parameters. This model could be extended by permitting an additional error term within each macro-level equation, but we will not do so in the present analysis (see, e.g., Mason, Wong, and Entwisle 1983; Judge, Griffiths, Hill, Lutkepohl, and Lee 1985, pp. 797–821).[16]

Table 5 reports the fit of several models within the framework of the SHD model and our extension of it.[17] In line A1, the model includes a main effect for each country (C) and a single set of marginal effects for all countries (A and B). In addition, the model fits a set of quasi-symmetric interaction terms (S), and it constrains these terms to be the same in each country. This model is clearly inconsistent with the data; however, in the following analyses, we use its fit statistic as a baseline to measure cross-national variation in the SHD parameters. In line A2, we again fit a quasi-symmetric model, but now we permit the full set of terms in the SHD parameterization (A, B, and S) to vary freely across the 22 countries. The fit statistic improves dramatically when the cross-national constraints on mobility are relaxed in this manner.

The models in panel B partition the variation in asymmetric marginal effects into explained and unexplained components. Model B4 forces the asymmetric effects to be the same in each country, and model B5 permits these effects to interact with the four exogenous variables. The latter model adopts the constraints expressed in equation 2, but it permits the remaining symmetric parameters to vary freely across the 22 nations. The contrast in line B6 shows that the four exogenous variables account for 36.5 percent of the association due to variation in asymmet-

[16] We thank Adrian E. Raftery for suggesting this extension.

[17] The results in this table pertain to the total frequencies rather than the Slomczynski-Krauze circulation frequencies. The fit statistics cannot be taken seriously because they are based on the standardized frequencies that Slomczynski and Krauze used.

ric marginal effects. The remaining unexplained variation is generated by other macro-level variables and by more proximate determinants of shifts in marginal distributions, such as class-specific fertility and mortality rates and the pace of secular occupational change.

The same procedures can be used to partition the variability in symmetric parameters into explained and unexplained components. In panel C of Table 5, model C9 constrains the symmetric effects to be the same in each country, and model C10 permits these effects to interact with the four exogenous variables. The symmetric terms in model C10 are forced to satisfy the constraints expressed in equations 3 and 4, and the remaining asymmetric terms are permitted to vary freely across the 22 nations. The contrasts in lines C11 through C13 show that the four exogenous variables can explain 66.1 percent of the association due to variability in the symmetric parameters, whereas the remaining 33.9 percent of the association is generated by variables omitted from the model.

The final panel in Table 5 partitions the total variability in the SHD model into explained and unexplained components. In line D14, we permit the exogenous variables to interact with asymmetric marginal effects (A), symmetric marginal effects (B), and parameters for symmetric association (S). This set of interaction effects forces the terms in the SHD model to satisfy the constraints expressed in equations 2, 3, and 4. If the test statistic for model D14 is contrasted with the test statistics for models A1 and A2, we can measure the explained and unexplained variation in the full set of symmetric and asymmetric terms. The contrasts in lines D15 through D17 indicate that the four exogenous variables can account for as much as 74.6 percent of the association due to cross-national variability in these terms.

In this set of illustrative analyses, we find systematic cross-national variability in both symmetric and asymmetric parameters of mobility. However, when we compare the contrasts in panels B and C, the total association due to variation in asymmetric marginal effects (line B8) is substantially smaller than the total association due to variation in symmetric effects (line C13). This result implies that cross-national variation in the effects of origin-to-destination shifts are small in comparison to the combined effects of cross-national variations in origin distributions and relative mobility chances. If we were to apply the SHD terminology, we would conclude that country-by-country variation in "circulation mobility" dominates the complementary variation in "structural mobility." It should be emphasized, at the same time, that the FJH hypothesis does not refer to cross-national variations in the full set of symmetric effects under the SHD parameterization. The latter hypothesis only pertains to relative-mobility chances.[18]

Table 6 reports a series of contrasts specifying the independent effects of each of the four exogenous variables. These contrasts were obtained by backward selection from a baseline model that includes all possible interactions between the exogenous variables and the full set of symmetric and asymmetric terms (line A1, Table 6). In the following panels, this model has been modified by deleting some of the interactions, and the chi-square statistics for the trimmed models have been contrasted with the baseline statistic. The series of models in panel B, for example, were constructed by deleting the interactions between social democracy and the terms for symmetric or asymmetric mobility (lines B2 through B4); the corresponding contrasts are presented in lines B5 through B7. In panels C through E, the interaction terms for the remaining independent variables are deleted in similar fashion, and the modified models are once again contrasted with the baseline model.

The results from this table reveal that most of these variables cannot account for a large percentage of the variation in asymmetric mobility. In panel B, we see that cross-national variation in the strength of social democratic parties can only account for 2.9 percent of the total variation in asymmetric mobility, while the same variable accounts for as much as 7.9 percent of the total variation in symmetric mobility. This contrast between the symmetric and asymmetric statistics is less impressive in some of the other panels (e.g., panel C), but the general result underscores the need to construct more powerful theoretical explanations of the

[18] The fit of the model of constant social fluidity is reported in line A3 of Table 5.

Table 6. Partitioning the Effects of Exogenous Variables on Symmetric and Asymmetric Mobility

Model	L^2	d.f.	L^2/d.f.	L_h^2/L_t^2
A. Baseline model				
1. {C} {AI} {AD} {AR} {AJ} {BI} {BD} {BR} {BJ} {SI} {SD} {SR} {SJ}	1478	141	10.5	—
B. Social democracy				
2. Delete {AD}	1488	143	10.4	—
3. Delete {BD} {SD}	1621	146	11.1	—
4. Delete {AD} {BD} {SD}	1900	148	12.8	—
5. 2 vs. 1 (Asymmetric effects)	10	2	5.0	2.9
6. 3 vs. 1 (Symmetric effects)	143	5	28.6	7.9
7. 4 vs. 1 (Total effects)	422	7	60.3	7.5
C. Economic development				
8. Delete {AI}	1515	143	10.6	—
9. Delete {BI} {SI}	1690	146	11.6	—
10. Delete {AI} {BI} {SI}	2314	148	15.6	—
11. 8 vs. 1 (Asymmetric effects)	37	2	18.5	10.7
12. 9 vs. 1 (Symmetric effects)	212	5	42.4	11.7
13. 10 vs. 1 (Total effects)	836	7	119.4	14.9
D. Asia				
14. Delete {AJ}	1498	143	10.5	—
15. Delete {BJ} {SJ}	1590	146	10.9	—
16. Delete {AJ} {BJ} {SJ}	1792	148	12.1	—
17. 14 vs. 1 (Asymmetric effects)	20	2	10.0	5.8
18. 15 vs. 1 (Symmetric effects)	112	5	22.4	6.2
19. 16 vs. 1 (Total effects)	314	7	44.9	5.6
E. Eastern block				
20. Delete {AR}	1479	143	10.3	—
21. Delete {BR} {SR}	1608	146	11.0	—
22. Delete {AR} {BR} {SR}	1674	148	11.3	—
23. 20 vs. 1 (Asymmetric effects)	1	2	0.5	0.3
24. 21 vs. 1 (Symmetric effects)	130	5	26.0	7.1
25. 22 vs. 1 (Total effects)	196	7	28.0	3.5

Note: A = Asymmetric Marginal Effects, B = Symmetric Marginal Effects, S = Symmetric Association, C = Country, I = Economic Development, D = Social Democracy, R = Eastern Block, J = Asia. The denominator in the L_h^2/L_t^2 ratio for lines B5, C11, D17, and E23 is the cross-national variation in asymmetric mobility (Table 5, line B8); the denominator for lines B6, C12, D18, and E24 is the cross-national variation in symmetric mobility (Table 5, line C13); and the denominator for lines B7, C13, D19, and E25 is the cross national variation in total mobility (Table 5, line D17).

causes and sources of structurally induced mobility.

The contrasts in Table 6 also show that economic development can account for a larger percentage of the cross-national variation than any of the other variables. In panel C, economic differences explain as much as 14.9 percent of the total cross-national variation in occupational mobility, yet the corresponding statistics for the remaining variables range from 3.5 to 7.5 percent. However, even after these variations in economic development have been controlled, systematic cross-national differences remain in symmetric and asymmetric patterns of mobility. The latter result implies that the "logic of industrialism" has by no means eliminated cross-national variations in stratification systems. It appears that cultural, political, or economic histories of countries can "live on" to produce distinctive patterns of occupational mobility and inheritance.

It is instructive to examine the estimated effects of the four exogenous variables. In Table 7, the entries in panel A are drawn from model B5 (Table 5), and the entries in panel B are drawn from model C10 (Table 5). If we turn to column 1 in panel A, we see that economic development increases mobility rates by upgrading and reshaping the occupational margins in a mobility classification (lines A1 and A2, column 1). Moreover, in panel B, we see that economic development also increases symmetric patterns of mobility, not only by enlarging the manual and nonmanual sectors (lines B3 and B4), but also by increasing the exchanges between these two sectors (line B5).

The estimates in column 2 make it clear that social-democratic policies can also be

Table 7. Effects of Selected Exogenous Variables on Symmetric and Asymmetric Mobility

Parameters	Economic Development	Social Democracy	Asia	Eastern Block
A. Asymmetric mobility				
1. α_1	.167	−.021	−.694	−.030
2. α_2	.089	−.064	−.250	−.037
B. Symmetric mobility				
3. β_1	.050	.160	.020	−.317
4. β_2	.113	.165	−.417	.002
5. δ_{12}	.050	.033	.158	.236
6. δ_{13}	−.022	.077	.561	.519
7. δ_{23}	.002	.036	.369	.442

Note: For convenience in presentation, the scale of the economic development variable has been divided by 1,000, and the scale of the social-democracy variable has been divided by 10. The estimates in panel A are from model B4 (Table 5), and the estimates in panel B are from model C9 (Table 5). See text for further details.

effective in reducing class-based inequalities in life chances (lines B5, B6, and B7). It appears, however, that the cost of these policies is slowdown in some types of occupational upgrading and a consequent reduction in structurally induced mobility (lines A1 and A2). The same type of trade-off is apparent in column 3. In this case, the two asymmetric effects are relatively weak within the three Asian countries in our sample (lines A1 and A2), whereas the interclass exchanges in these countries are relatively strong (lines B5, B6, and B7). It is commonly argued that Asian countries have hierarchical and status-based cultures; nonetheless, in comparison with other classifications and net of other variables, we see no evidence of any closure in their relative-mobility chances. Indeed, in the present data, the effects are in precisely the opposite direction.

The final set of estimates suggests that political policies can have substantial effects on patterns of social fluidity. In line B5, for example, we see that exchanges between manual and nonmanual sectors take place 27 percent more frequently in socialist countries than in their nonsocialist counterparts, i.e., $e^{.236} = 1.27$. However, in panel A, the corresponding interactions with the asymmetric terms are small (and negative). This set of results suggests that socialist programs have no strong implications for the rates and patterns of structurally induced occupational mobility, whereas they do reduce class-based inequalities in life-chances. It is precisely these types of nonuniform effects that are obscured by the Krauze-Slomczynski decomposition.

This illustrative model could be extended or elaborated in several ways. It might be useful, for example, to model the row-by-column interactions more parsimoniously by fitting association parameters (e.g., Goodman 1979), crossings parameters (e.g., Goodman 1972), or any related effects that imply symmetric patterns of interaction.[19] Indeed, if the cross-national variability in the row-by-column interactions could be summarized in a single parameter, it would be useful to proceed by modeling the sources or causes of this contrast alone (e.g., see Grusky and Hauser 1983; Yamaguchi 1987). In some data sets, the cross-table variability in asymmetric "shift effects" could also be summarized with single linear or nonlinear contrasts, and the macro-level variables could be forced to operate through these terms. The latter extension has been carried out elegantly by Ultee and Luijkx (1986; also, see Hope 1982; Yamaguchi 1987).

CONCLUSION

We find numerous shortcomings in the work of Slomczynski and Krauze (1987). They did not produce an "operationalization of the original FJH hypothesis" (p. 609), or even refer to its "original formulation" (p. 599). On the contrary, their representation of the structure and development of this hypothesis is inaccurate, and their proposed test of it is logically incorrect. Moreover, they have not given "precise meaning" to the concept of circulation mobility (p. 609), since their operational

[19] It should be kept in mind, of course, that our estimates of the symmetric marginal terms are *not* invariant under these types of reparameterizations of the row-by-column interactions. The asymmetric terms are invariant under some circumstances (see Sobel, Hout, Duncan 1985).

measure fails to satisfy basic methodological requirements of comparative analysis, and their definition is not even maintained consistently within their own text. They have surely not carried out the first "direct test" of the Featherman-Jones-Hauser hypothesis, for the Krauze-Slomczynski mobility decomposition is unrelated to this hypothesis.

The central defect of Slomczynski and Krauze (1987) is their adoption of the Krauze-Slomczynski (1986a) matrix decomposition. This is compounded by their failure to profit from criticism of their earlier work by Sobel, Hout, and Duncan (1986), or even from the constructive portions of their response to their critics (Krauze and Slomczynski 1986b). The absence of a statistical model and, consequently, of a framework for inference severely limits the usefulness of their conceptual scheme. One might regard the work of Slomczynski and Krauze (1987) as an illustration of the defects in the decomposition to which Sobel, Hout, and Duncan took exception.

In our effort to understand what Slomczynski and Krauze have done, we attempted to reproduce their analyses and findings. These reanalyses have been hampered by inconsistencies in their paper and by their unwillingness to provide us with some of their data. Nonetheless, we have located several questionable procedures and doubtful findings in their empirical work and have shown how these made it easier for them to reject the FJH hypothesis, as they construe it. Finally, even if one were to accept their concepts and measurements of "circulation" mobility, serious weaknesses would still remain in their efforts to measure and explain cross-national variation in it.

In the concluding section of our paper, we have offered a multiplicative model that, we think, addresses the substantive problems posed by Slomczynski and Krauze (1987). This model is based on the Sobel-Hout-Duncan parameterization of the mobility classification, but we have modified it by permitting exogenous variables to affect both symmetric and asymmetric parameters of mobility. We hope that this model will provide a useful template for more detailed and comprehensive cross-national comparisons of social mobility.

APPENDIX. Listing of the Exogenous Variables for 22 Nations

Country	Economic Development	Social Democracy	Eastern Block	Asia
1. Australia	4795	39.5	0	0
2. Austria	2630	46.1	0	0
3. Belgium	4727	34.9	0	0
4. Canada	7653	5.5	0	0
5. Czechoslovakia	5676	0.0	1	0
6. Denmark	4172	44.2	0	0
7. England and Wales	5151	45.7	0	0
8. Finland	2679	26.5	0	0
9. France	2951	11.6	0	0
10. Hungary	2812	0.0	1	0
11. Italy	1787	18.6	0	0
12. Japan	1783	35.7	0	1
13. New Zealand	2530	49.1	0	0
14. Norway	3588	49.3	0	0
15. Philippines	209	0.0	0	1
16. Poland	3504	0.0	1	0
17. Spain	1023	0.0	0	0
18. Sweden	4506	48.3	0	0
19. United States	9201	0.0	0	0
20. West Germany	4234	37.4	0	0
21. West Malaysia	357	8.2	0	1
22. Yugoslavia	1192	0.0	1	0

Note: The economic-development variable refers to per capita energy consumption in kilograms of coal in 1965 (Taylor and Hudson 1972, pp. 326–28), and the social-democracy variable refers to the proportion of seats in the national legislature held by socialist or "social democratic" parties averaged over the elections immediately preceding and following 1960 (Jackman 1975, pp. 216–18).

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